



Invader PDW G17 V2 v0.2.2-beta

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PREFACE:

The Invader PDW is a remix of the FDMA DD17.2 that is born of my interest in building a compact, Glock-compatible frame with a collapsing brace and forward magazine holder. I started with the FDMA since it was a well refined platform with a known process for acquiring parts and assembling. This being the case, the frame has the same compatibility and features that the base FDMA frame does. In this document I've included all my build notes and known issues with the current iteration.

If you've found this design and documentation worthwhile, please consider supporting my efforts by donating Bitcoin so that I may continue to develop and adapt this design to other pistol models:



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Required Materials and Tools

There are several materials needed to assemble the frame. Here's a shopping list for everything you'll need to assemble your Invader PDW.

Off the shelf items:

1. Standard 80% Glock Lower Parts kit
2. Standard 80%/OEM Complete Slide
3. FDMA-compatible G17/DD17.2 Slide Rails from Riptide Rails, Aves Rails, Etc
4. Full size Locking Block
5. A G17 Compatible, 9mm magazine (17rd or larger)
6. One additional Magazine Catch

Hardware: (note: The items below can be purchased as a kit from my store at shop.digitalnimbuslabs.com)

1. Brace rails: 1/8" x 1/4" x 10 1/2" steel bar stock x 2
2. Brace rail pins: 3mm Dia. x 10mm Brace Pin x 2
3. Mag catch spring: 0.2mm Dia x 36mm Spring Steel Wire x 1
4. Brace deploy spring: 10mm OD x 40mm, .05 wire diameter compression spring x 1
5. Brace locking plate spring: 3mm OD x 10mm compression spring x 1
6. Brace deploy spring pin: 3/16" x 1-7/8" Cotter Pin with C-clip OR M4 x 45mm Screw and M4 Nut
7. Brace deploy spring pin washer: 3/16" Washer OR M4 Washer
8. Brace bar end-stop screws: 1/8" long (#6-32 if using the pre-fab bars)

Required/Recommended Tools

1. Hammer
2. Needle Nose Pliers
3. 1/8" or smaller punch
4. Precision flathead screwdriver
5. Hobby Knife
6. Drill with 1/8" bit
7. Hacksaw
8. Dremel
9. Metal File



Printing the Invader

Printing the frame uses the same settings from the recommended FDMA setup. An excerpt has been pasted below but reference the README file in the FDMA project for full details. You can use the exact same settings for all parts. If you already have preferred settings from a previous FDMA print, continue with those.

Nozzle: 0.4mm

Layer Height: 0.15mm

Temp: 218C Nozzle, 60C Bed

Infill: 100%

Supports: Tree Supports Everywhere, 1 wall, 1 layer-height z gap distance. Optional support blocker for the brace housing.

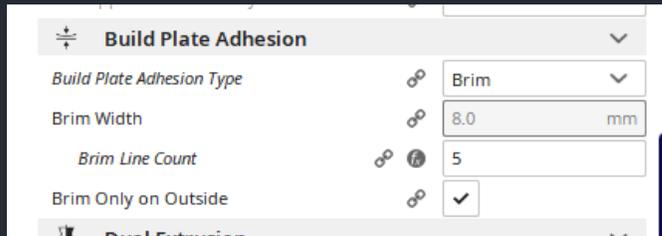
Cooling fan: 20% normal, 50% on bridges. Off for the first 10 layers. Keep the fan low to prevent warp.

Bed Adhesion: gluestick or hairspray or both

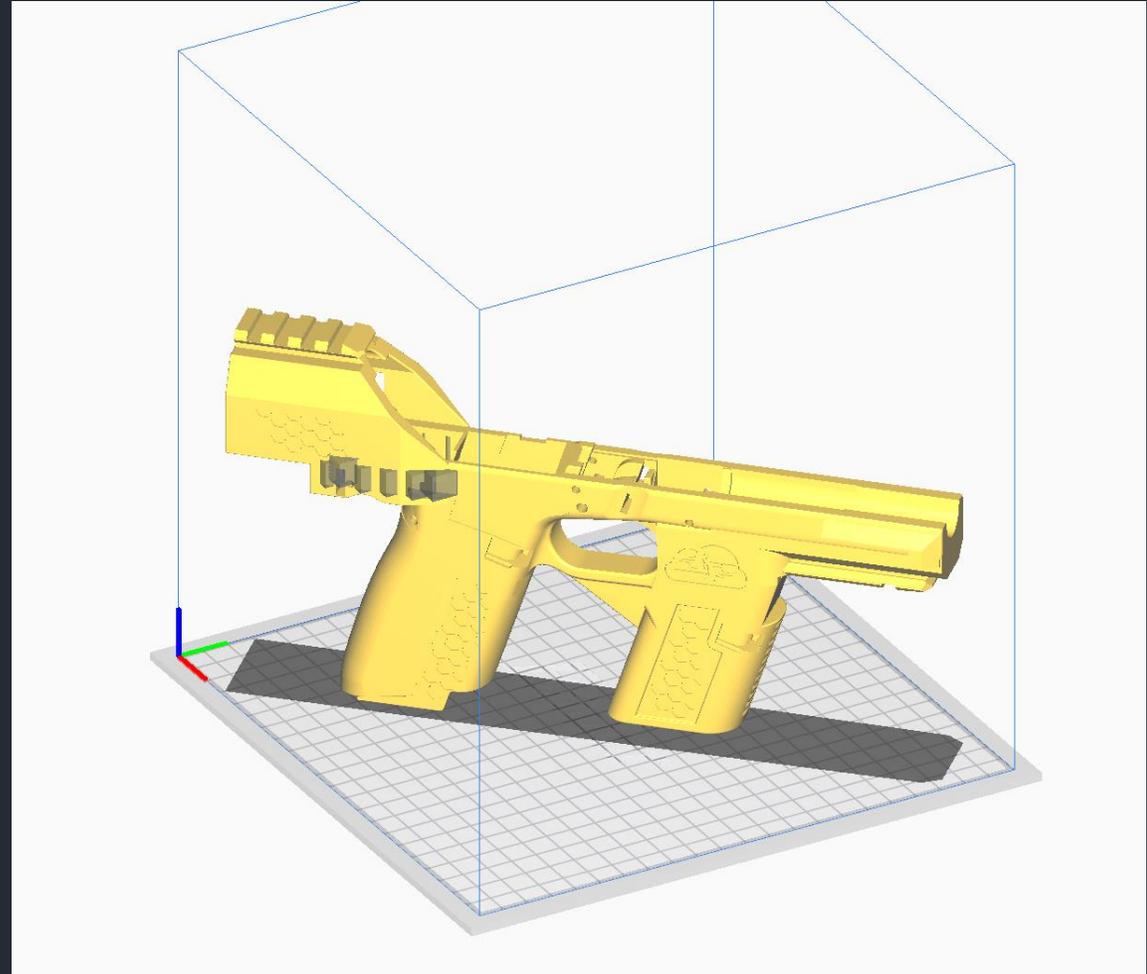
Post processing: If you print your frame upright, you can clean up the rough bottom-facing areas of your print with a soldering iron - after removing supports, take your soldering iron and melt the rough patches on the frame together to make them smooth.

All other settings can/should be left as default or whatever you know works best with your printing setup.

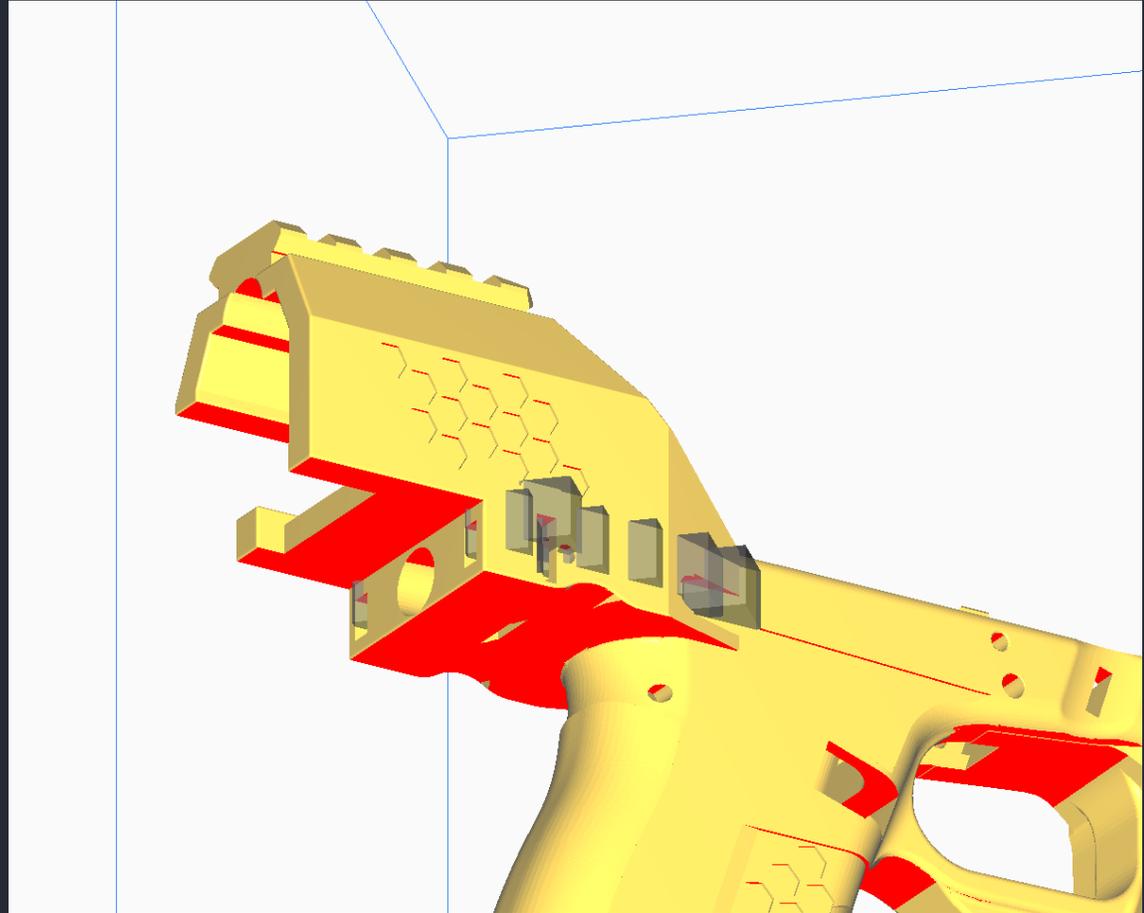
The most difficult part of setting up the print for this is ensuring that it will fit on the build plate. The Invader is designed to fit on a standard Ender 3/5 build plate. The crucial setting is in the “adhesion” section. Use Brim adhesion, reduce your brim lines count to 6 or less*.

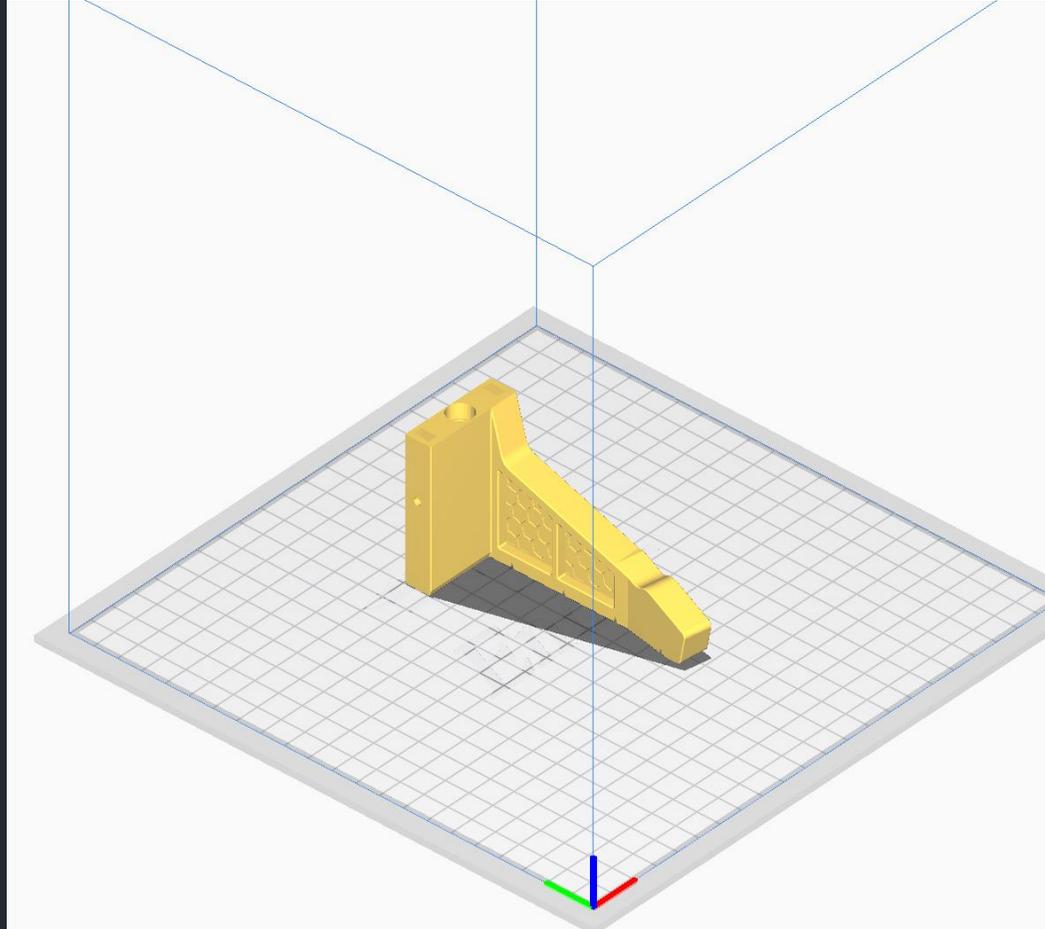


** This may need tweaking depending on your nozzle size, these settings are for .4mm*



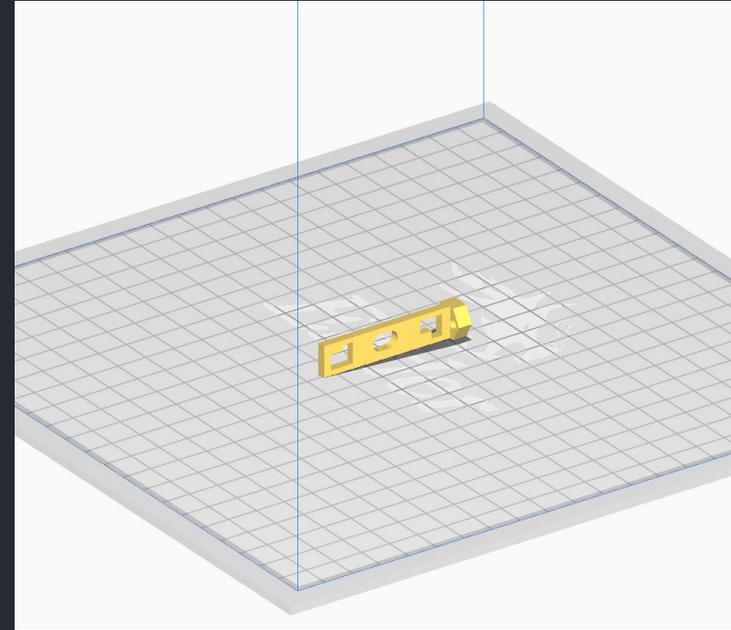
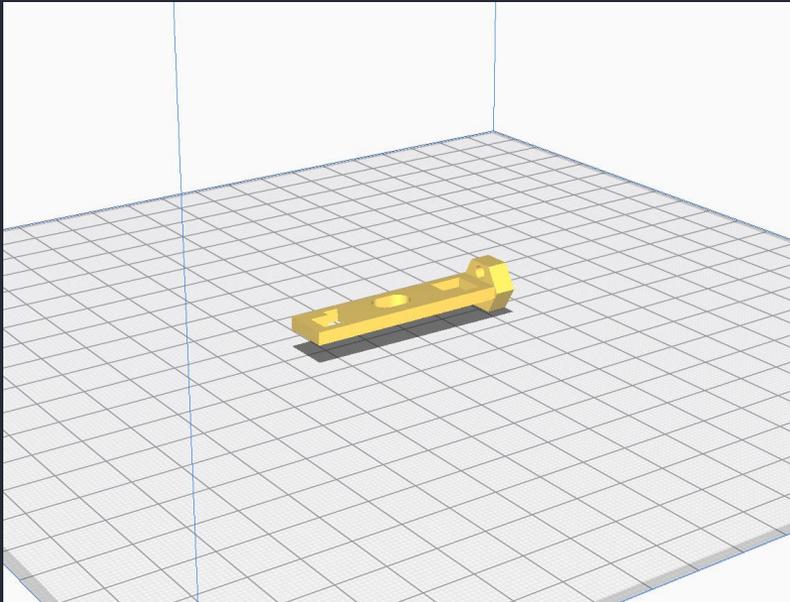
To aid with post-print clean up. You may opt to add support blockers in Cura against the tops of the channels inside the brace housing.



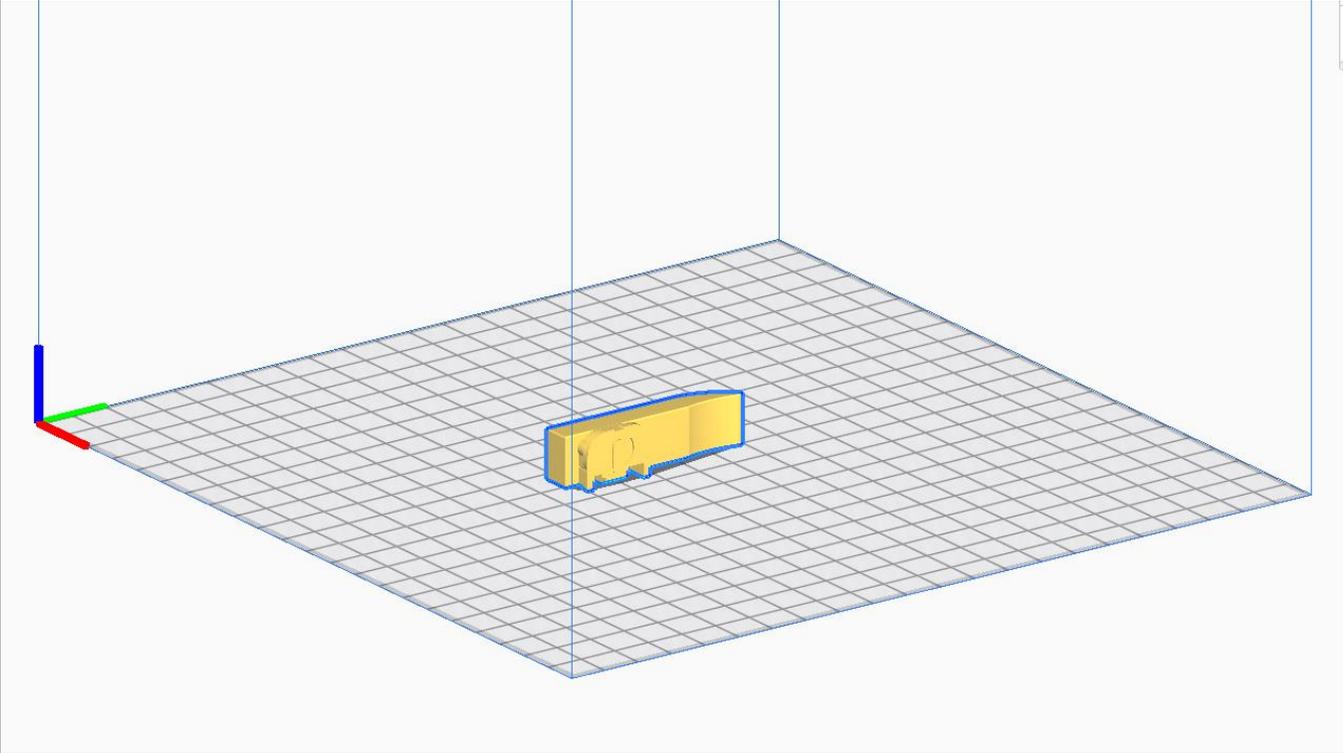


Print the brace on its back like this for the best strength across the vertical plane. This also has the fewest “hard-to-remove” supports. They’ll be in the pin holes.

Nothing too tricky here. Lay the part flat on its side and print it like this.

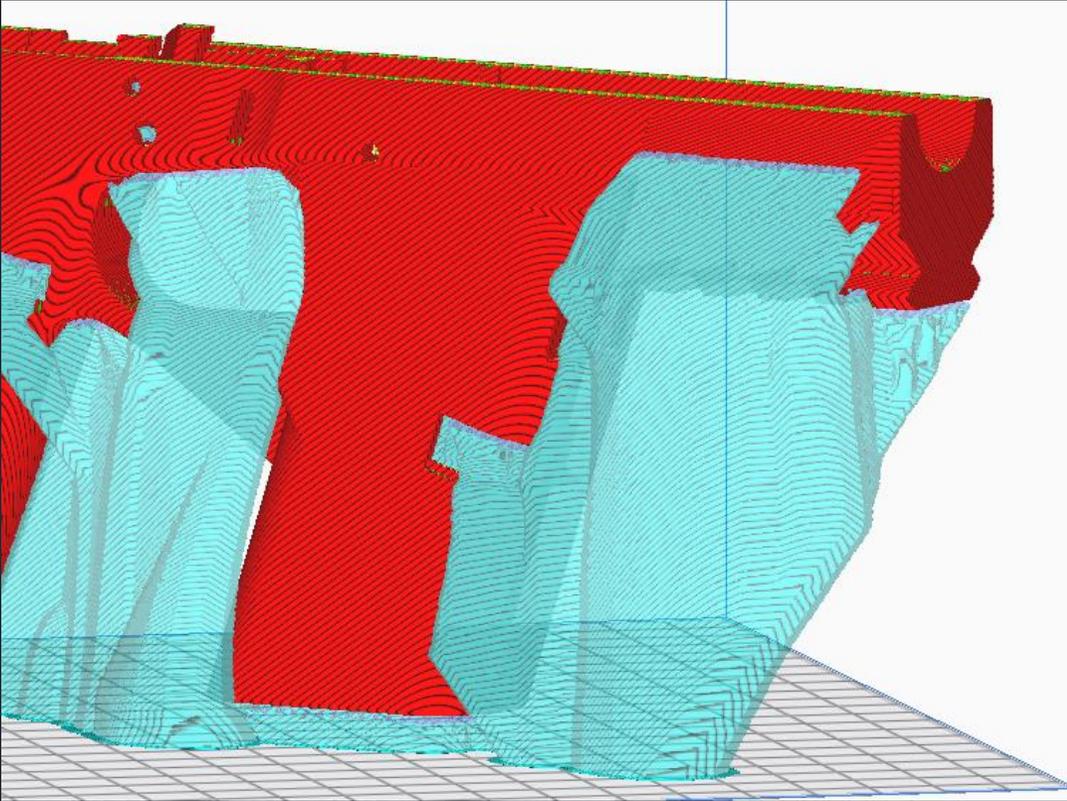


The alternate version of the plate has the button shape rotated to print flat like this. This will yield a stronger part, but may require more clean-up to function.



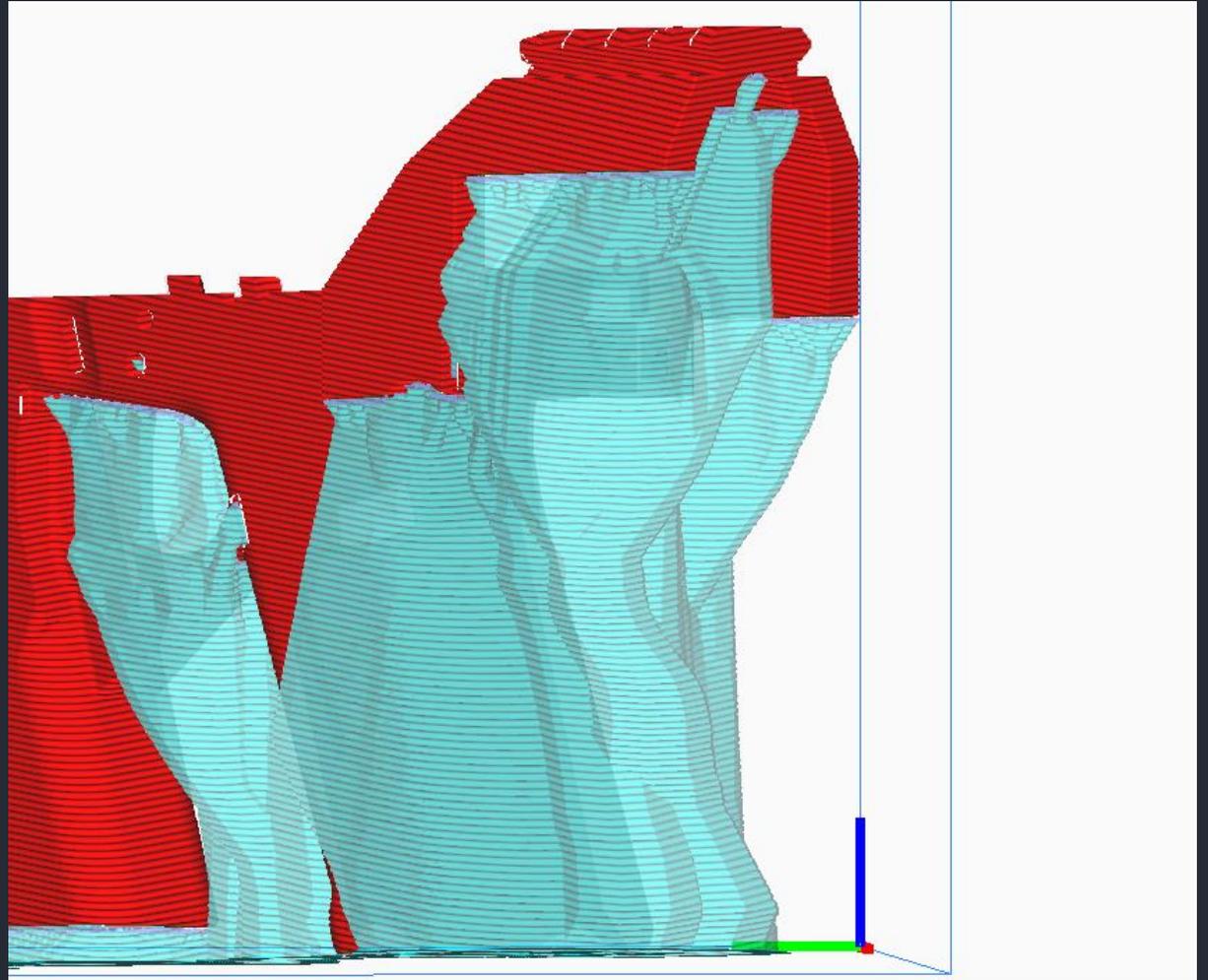
Straight forward orientation here. Just lay it on the bottom like this.

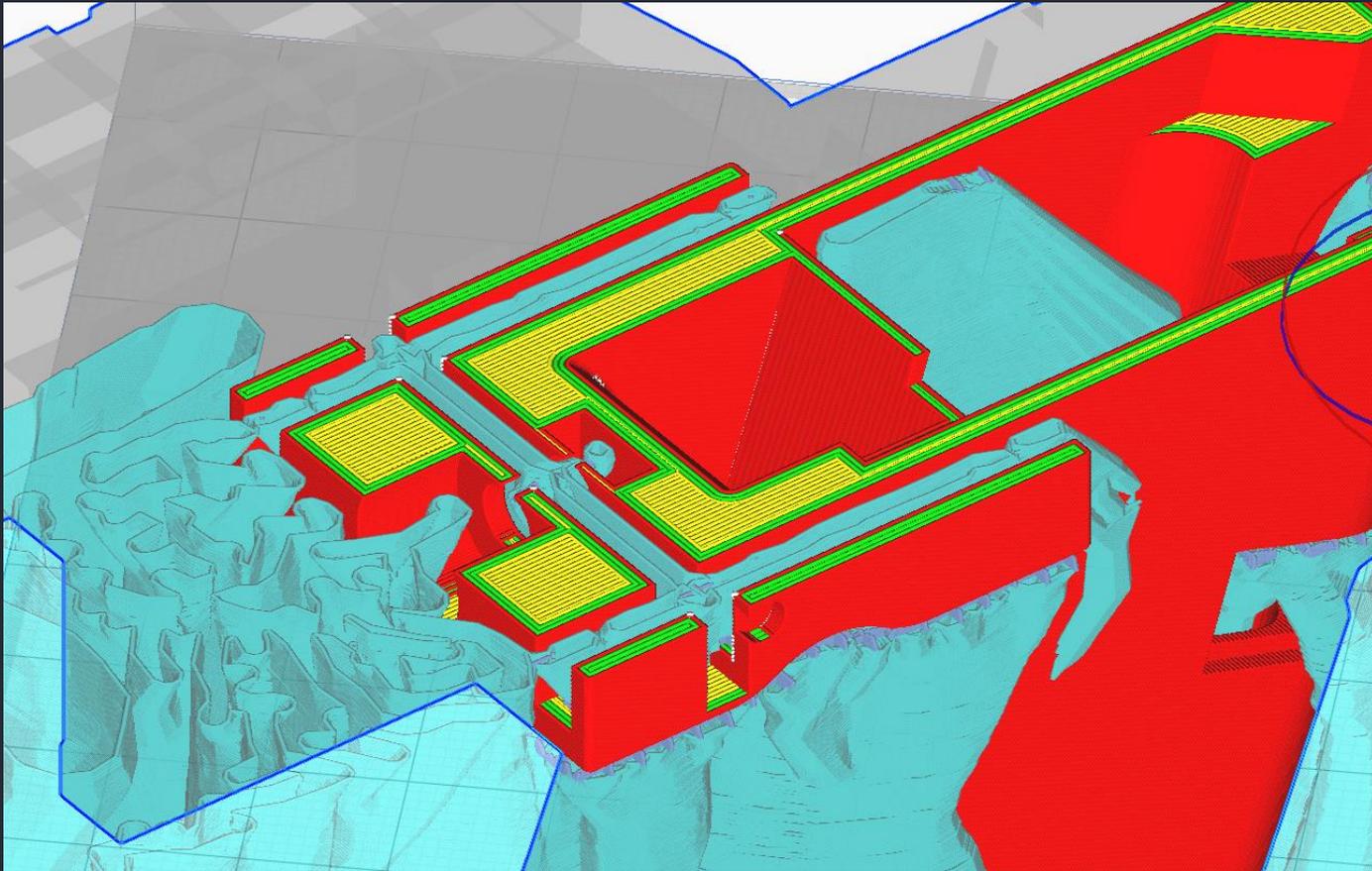
Removing Supports



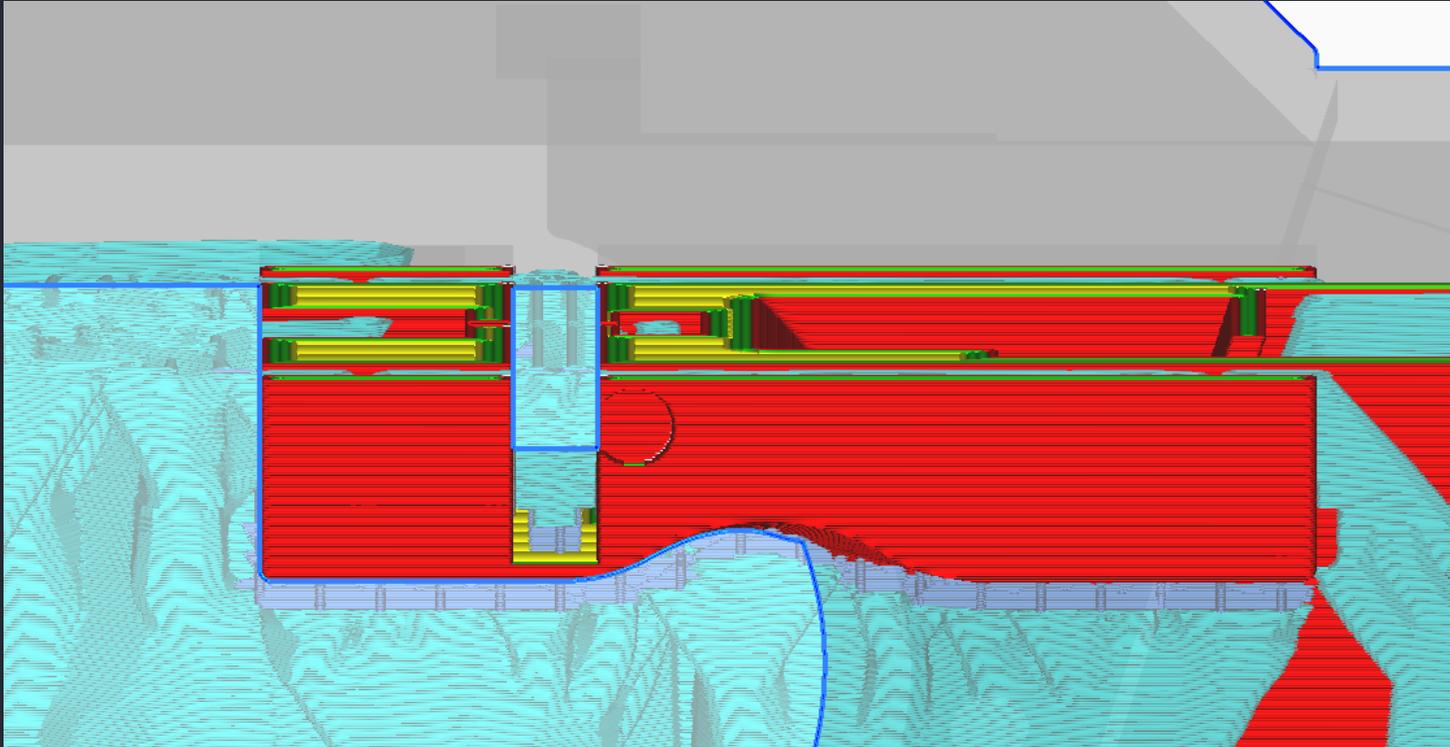
The supports on the front end of the frame are easy to remove and are generally the same as the FDMA DD17.2 supports. The forward mag holder warrants a special mention, however. Not hard to remove, you'll just need to detach the supports outside the mag catch channel before attempting to break the supports inside loose.

The supports on the rear are pretty easy to remove as well, nothing too difficult here. Just remember that there is a hole just to the rear of where the grip meets the frame. It'll be covered by support interfacing.





The hardest of the work starts with removing the supports shown in the cutaway here (in gray). Be patient with removal and try not to get too heavy handed with it. The most successful methods are shared in the next few pages

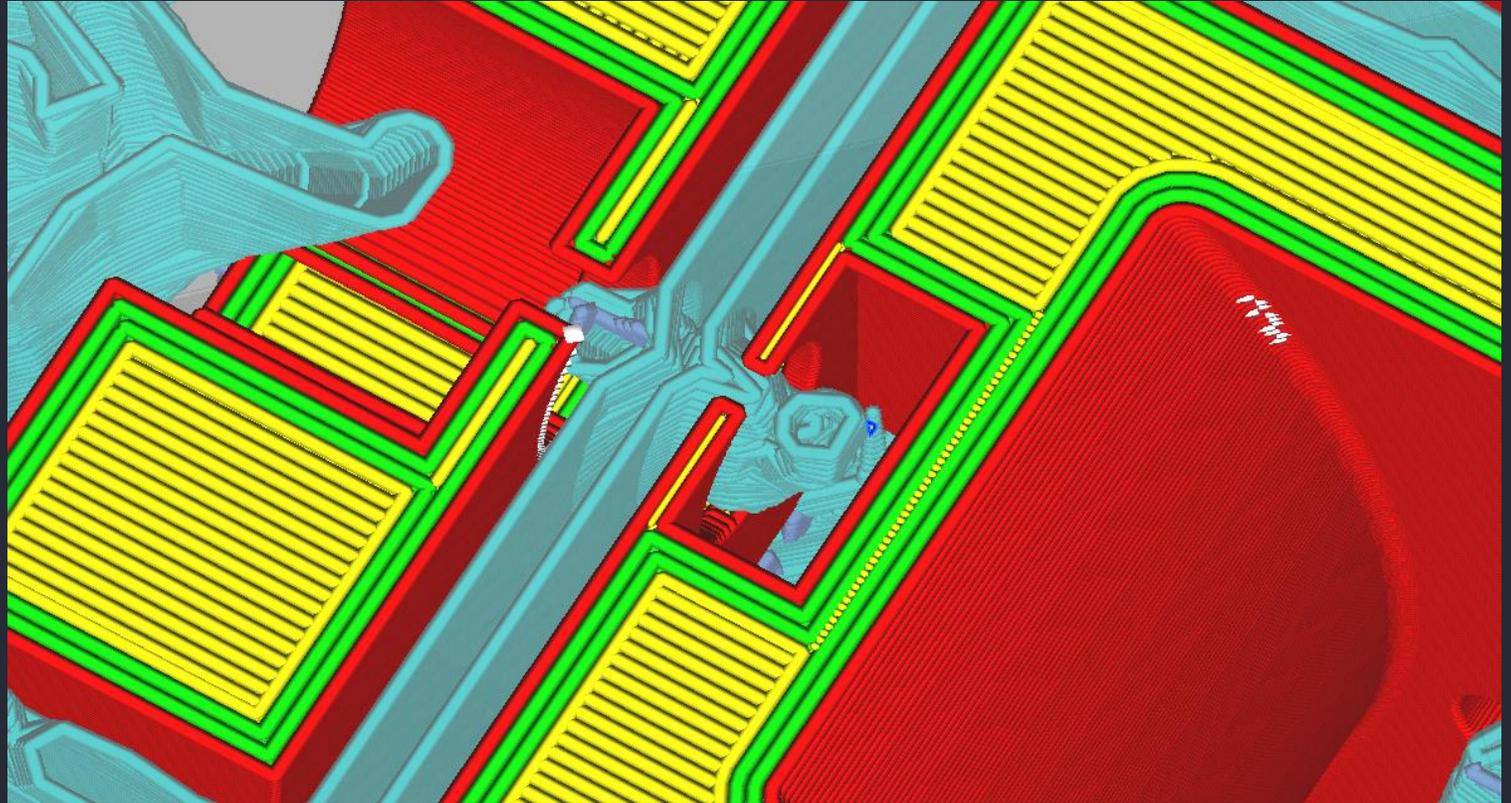


After removing all the supports on the exterior, start on the internal supports by using a hobby knife to cut through the supports vertically on both sides of the channel for the brace plate (see picture to the left). Do this on both ends.

Here, use the hobby knife to cut as much material from the c-clip hole (from the bottom) as possible to free up the supports in the brace plate channel.

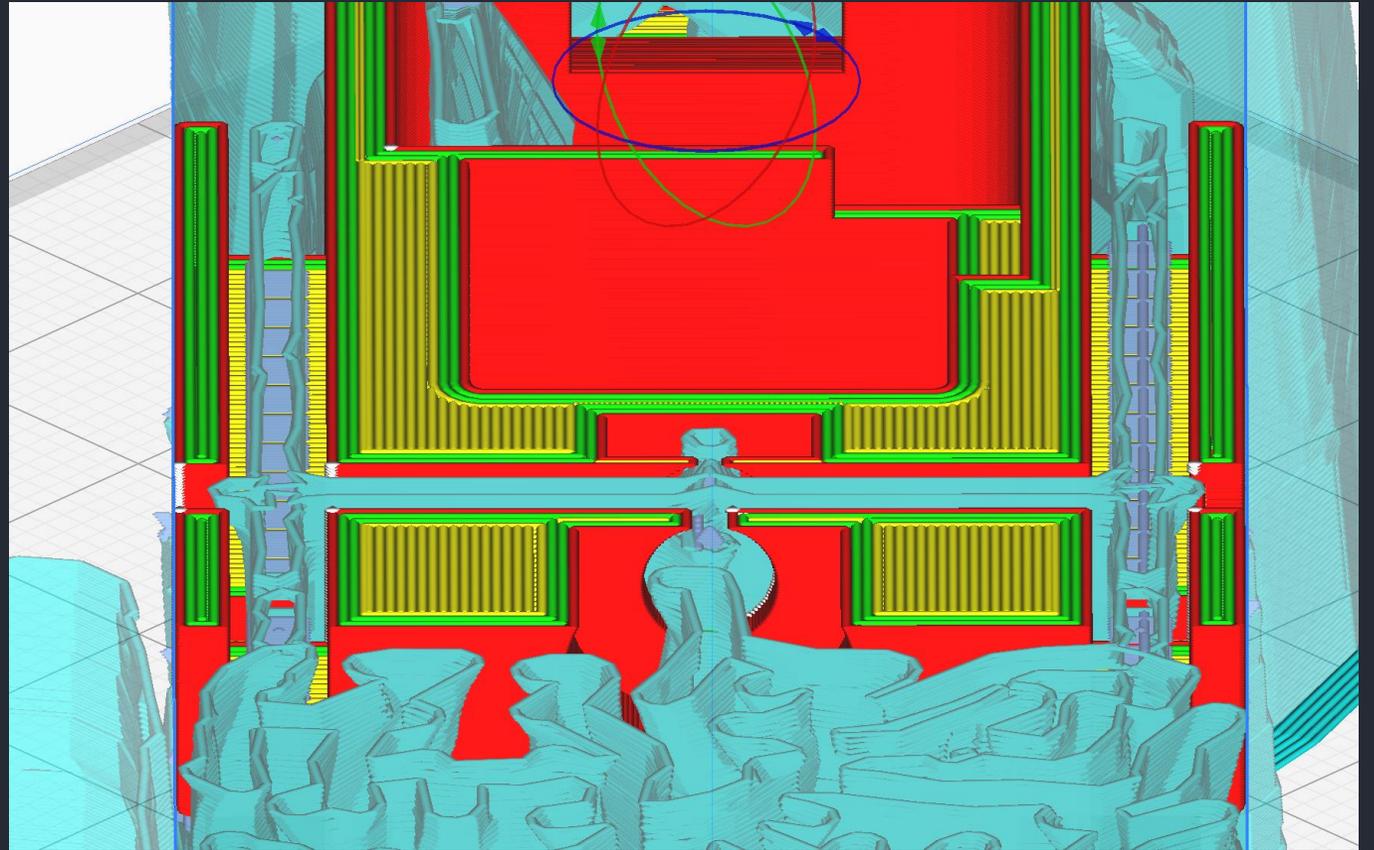
Use a small punch or a small drill bit to clear out the material down the hole for the spring pin. The goal is to remove the section of supports in the channel to be removed cleanly through the end of the channel. Use a long precision flathead screwdriver and a punch to clear it out.

Ensure that there is no debris in the channel with a visual inspection. Any material left in will prevent installation of the brace locking plate.



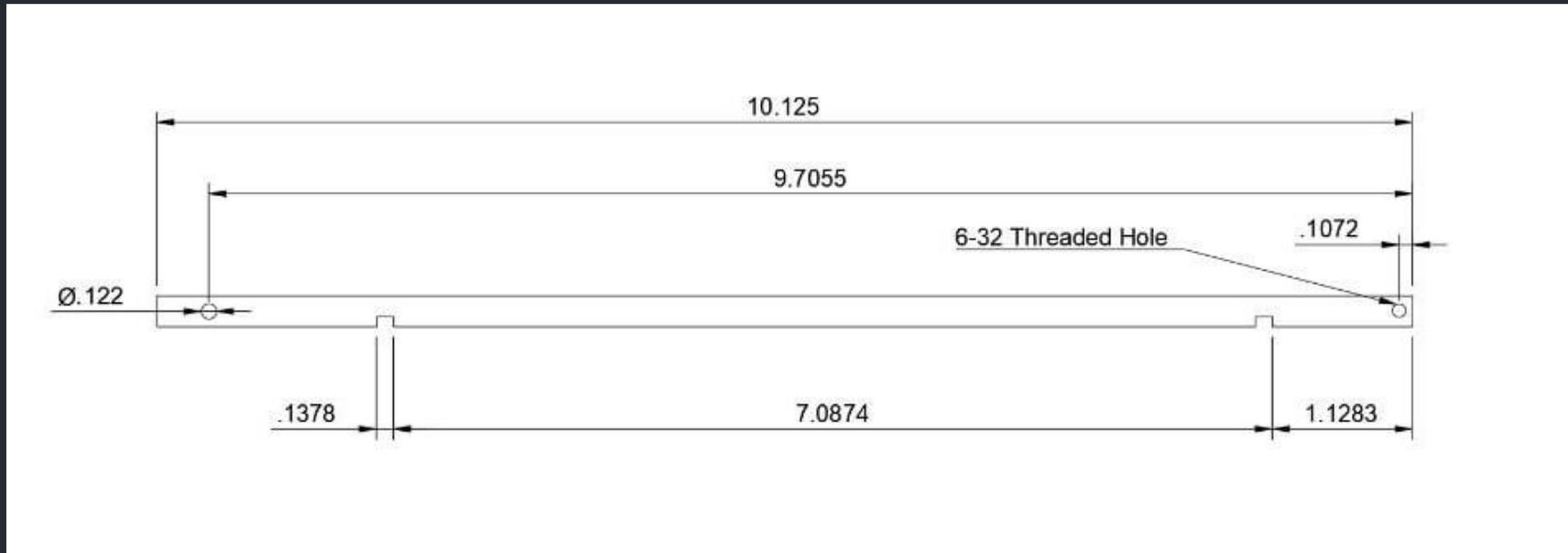
After cleaning out the central channel, the segments for the brace bars should be relatively easy to remove. Use a small screwdriver or punch to break them loose, then grab the ends that stick out with pliers to pull them out. You can then use the bars for the brace to push out any remaining support material.

Ensure there is no more material left in the brace bar channels with a visual inspection. Any debris in there will prevent installation of the brace and/or affect the deployment of the brace.



Machining the Brace Rails

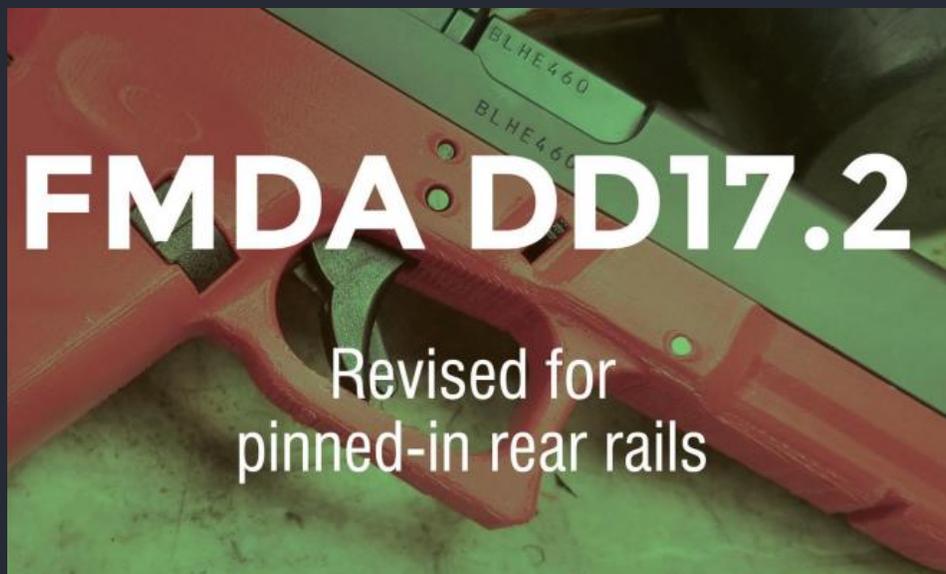
If you haven't ordered the pre-made rails from my store, your next step is to machine the brace rails. Here's are the design dimensions in mm and inches. The most critical part is that the notches be 180mm apart and be the correct distance from the brace pin hole. The prototype was made using a hacksaw to cut the depth of the notches, then dremeled out the remaining material, filing everything smooth. It helps as well to clamp the rails together and file the notches even. The notch width and depth specified is what works best, but you may need to tune this based on fitment with your brace locking plate.



Dimensions in Inches

FDMA Assembly

Congratulations, the hardest part is over and now you're on the home stretch. All that's left is to assemble the finished pieces. The next step is to follow the normal FDMA DD17.2 Assembly instructions. I've included the PDF in the build files. At this point, install your slide with the OEM style backplate. You will not be able to install your slide with the charging handle installed.



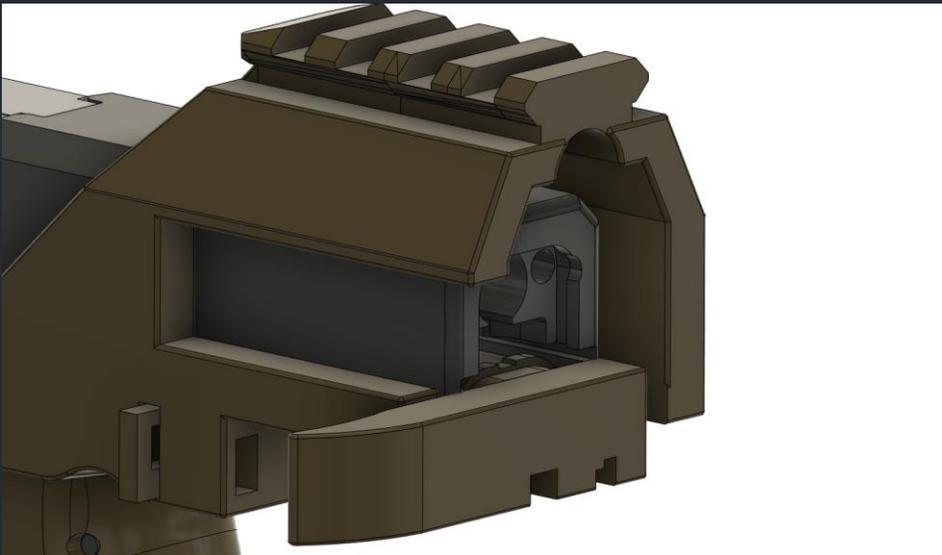
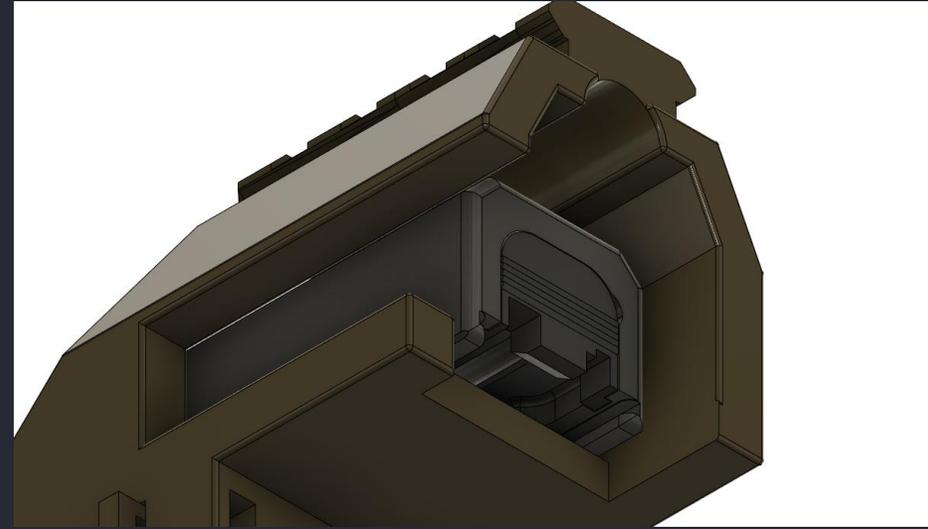
Installing the Charging Handle

Installing the charging handle is a two-step process. You can do this step later, but the brace spring will not give as much room to work with. Be sure that your function tests are passing at this point. The next steps will guide you to remove the rear slide cover plate and replace it with the charging handle cover plate.

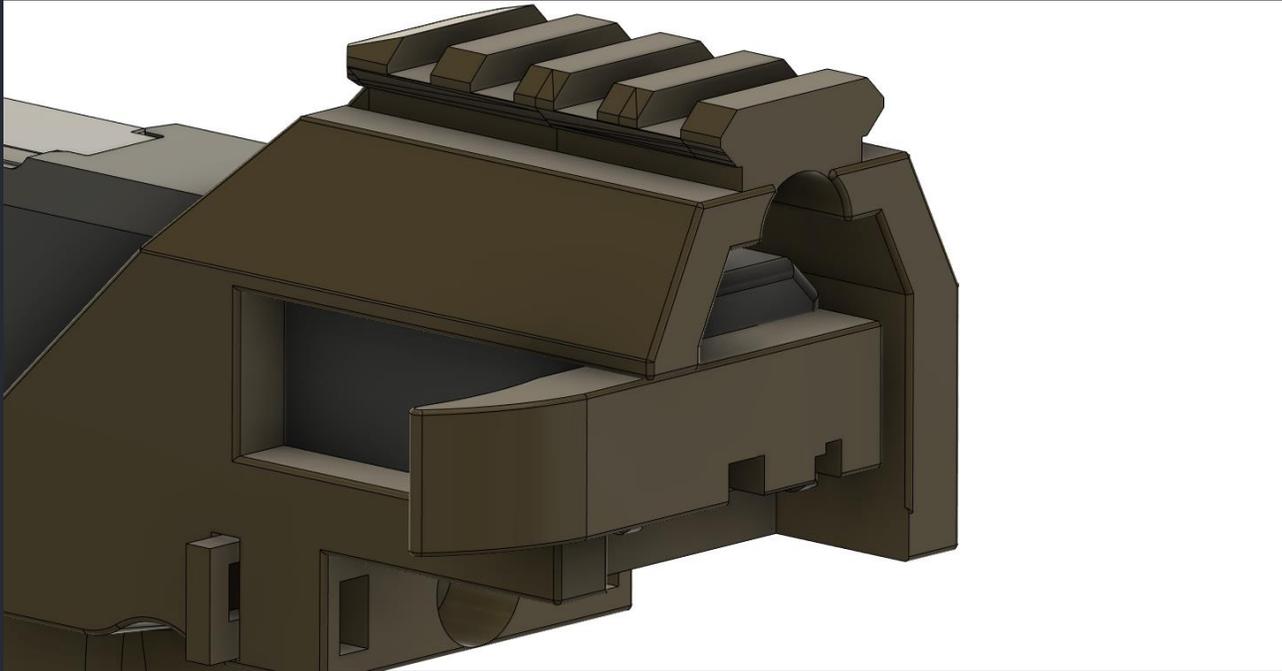
With the slide installed on the frame, the first step is to put your slide into the rear, locked position, and carefully remove the OEM backplate.



Locking the slide back will give you access to the slide cover plate. With the bottom of the slide cover plate exposed, remove the slide cover plate. At this point, the slide internals are loose, have your charging handle nearby and ready to install.

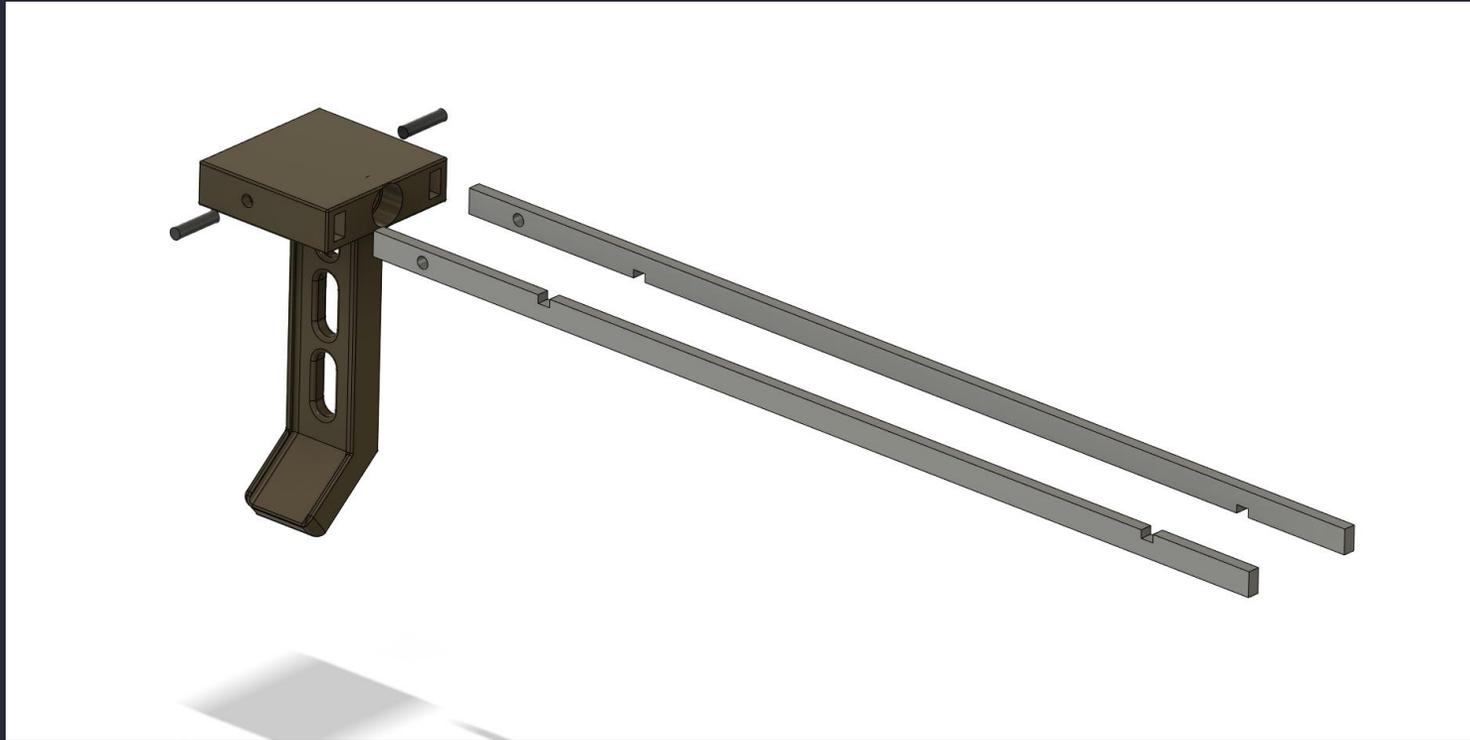


The charging handle slide cover plate installs in the same way the OEM style cover plate does. Line up the plate with the channels in the slide. Then depress the firing pin liner to allow insertion of the charging handle.



You'll then need to depress your extractor spring to push the charging handle plate the rest of the way into the slide. Once installed, it should be flush with the bottom of the slide and shouldn't contact the frame in any significant way. Once installed, perform function tests by using the handle to rack the slide multiple times, ensuring smooth operation.

Brace Assembly



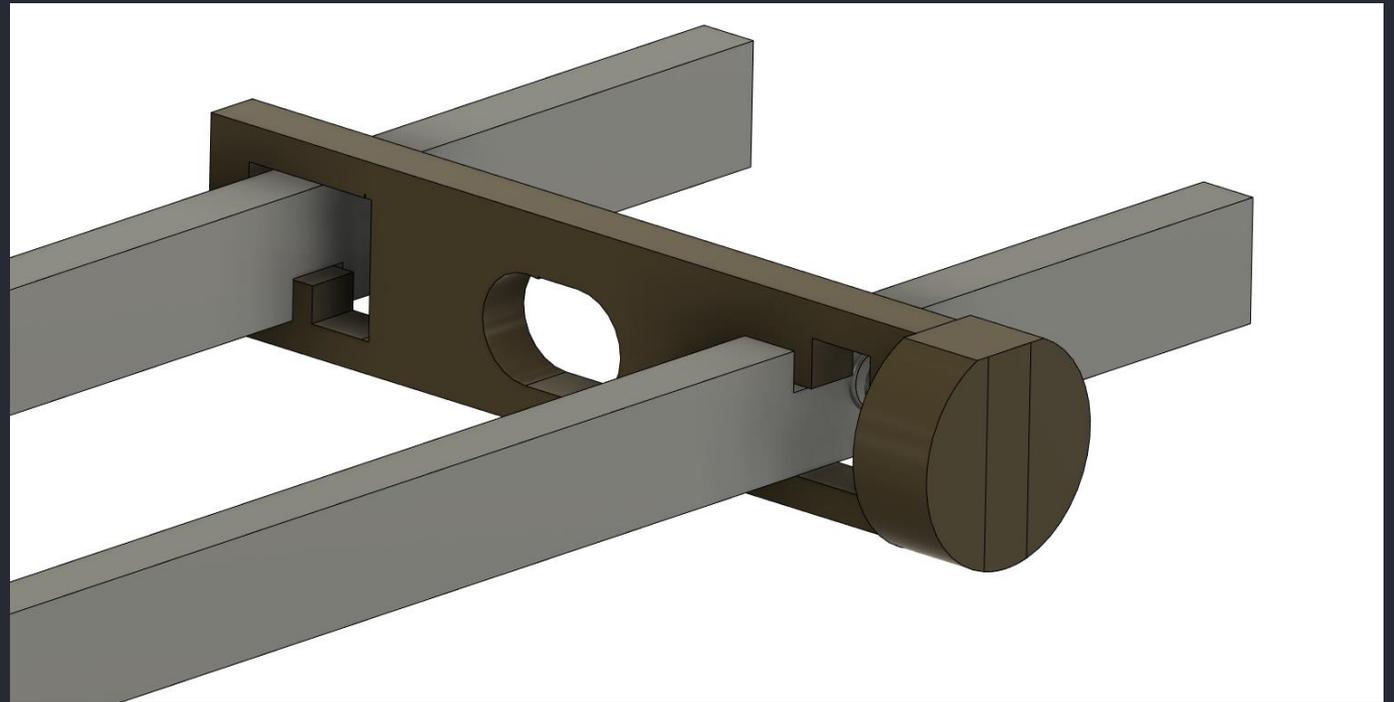
Insert your rails and secure them with your 3mm x 10mm pins. They will sink in past the surface of the brace, but it is not necessary to punch them all the way in. You may use a little glue to hold them in place.

Once your brace is assembled, take a moment to test fit it with your locking plate and ensure that the parts fit together properly.

Your bars should fit within the taller openings with ease and pass smoothly through them.

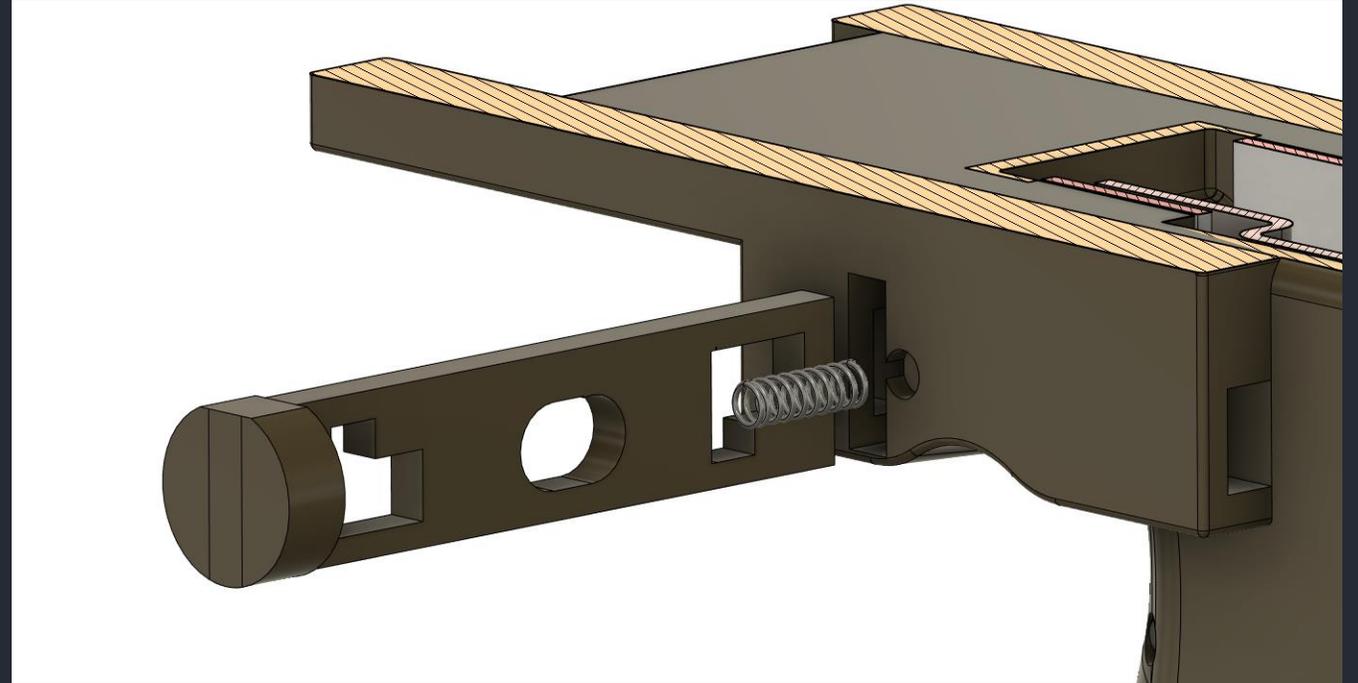
The smaller openings should index with the notches on your brace bars completely and overhang some. The goal is for this fit to be as close as possible without resistance.

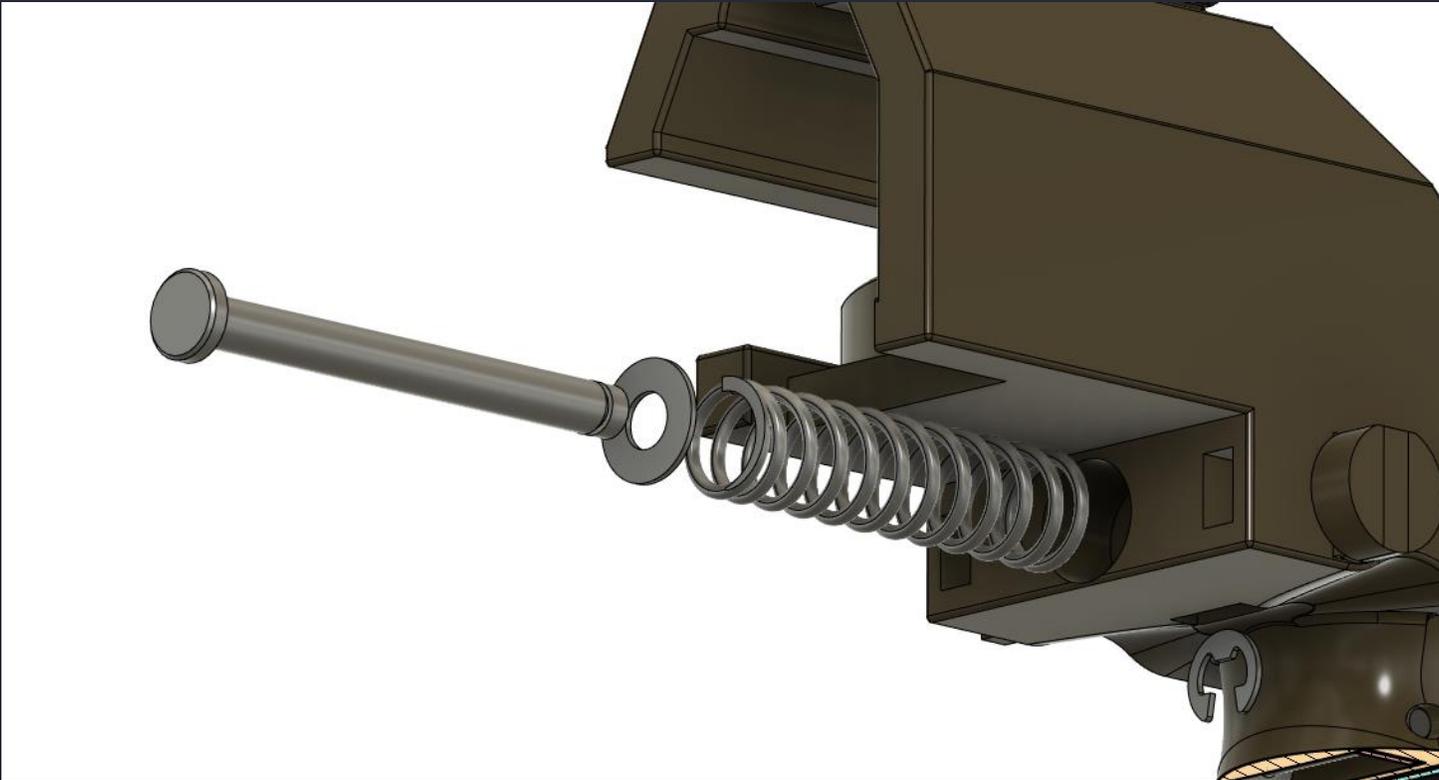
If the locking plate does not fit properly, you can either remove material from the brace bars or remove material from the locking plate. I recommend removing material from the locking plate, since that part is much easier to replace.



Invader Brace Installation

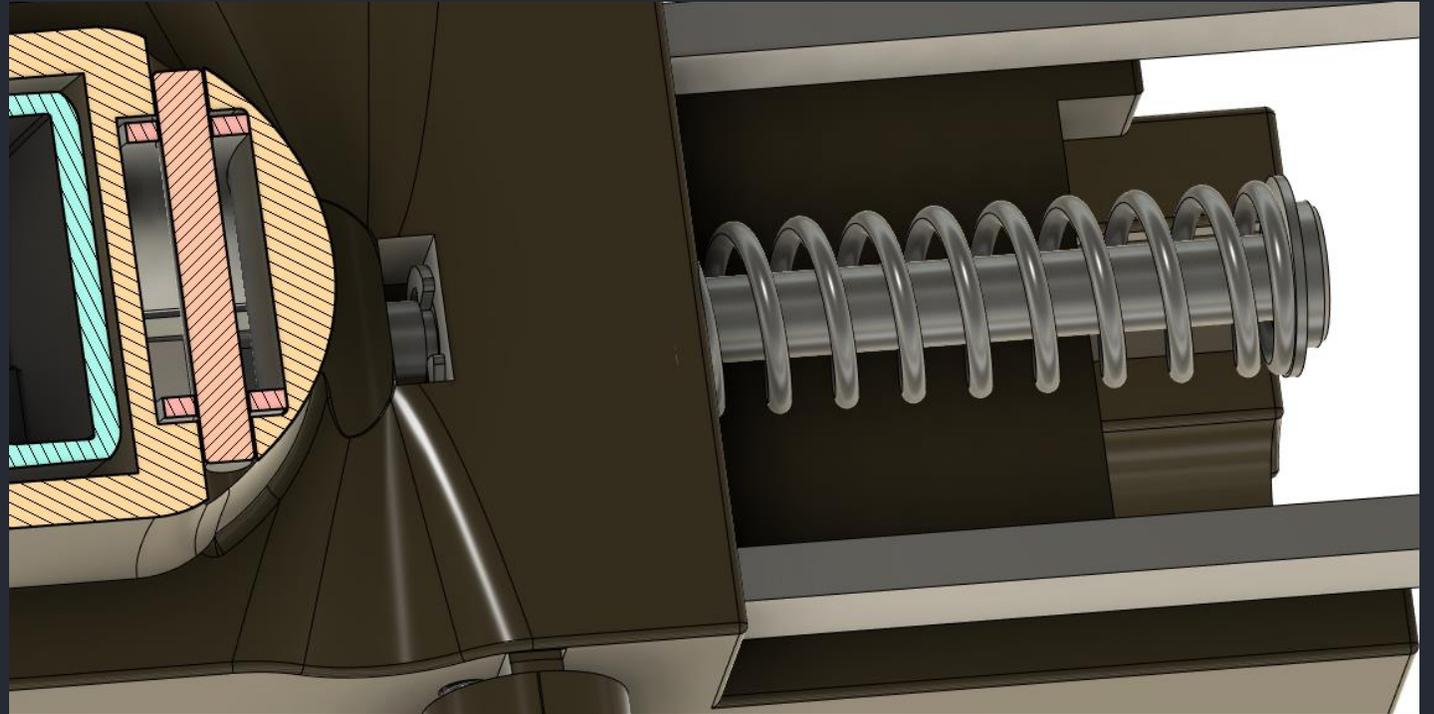
Begin by installing the brace locking plate. Insert the locking plate, making sure to sandwich the locking plate spring between the frame and the locking plate button.



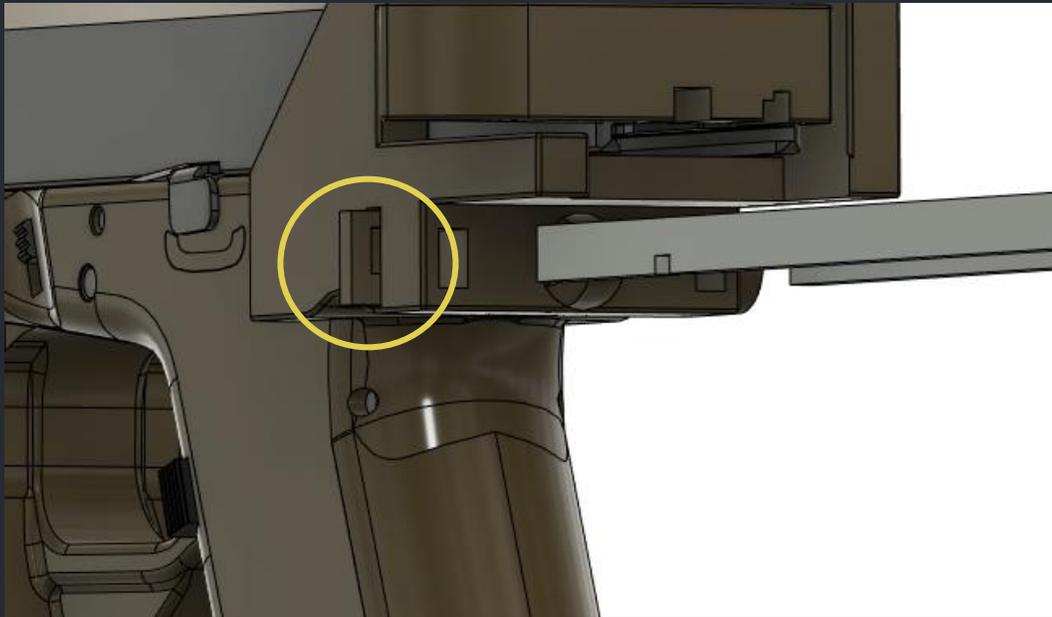


Insert the brace pin through the washer and the brace deployment spring. Then insert it into the rear of the frame through the hole, ensuring that it passes through the brace locking block

To install the c-clip, you'll need to ensure that the pin is completely pushed into the frame. The groove for the clip should be exposed allowing installation of the c-clip through the hole just behind the grip on the bottom of the frame. This can be tricky to install due to the grip being directly above the hole. One method is to use the nose of needle nose pliers to push the c-clip into position from an angle to the side.

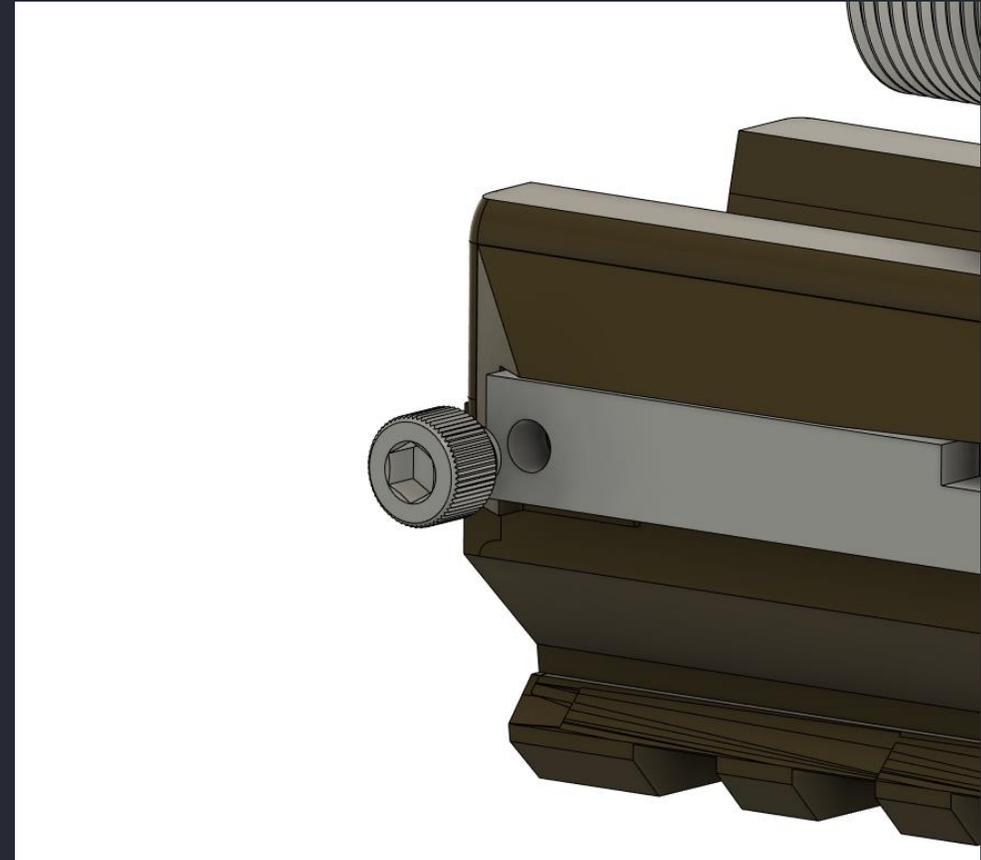


With the brace locking plate button completely depressed, insert the brace bars into the frame. It is normal for this to be snug at first. It will loosen up as you move the bars through the channel repeatedly.



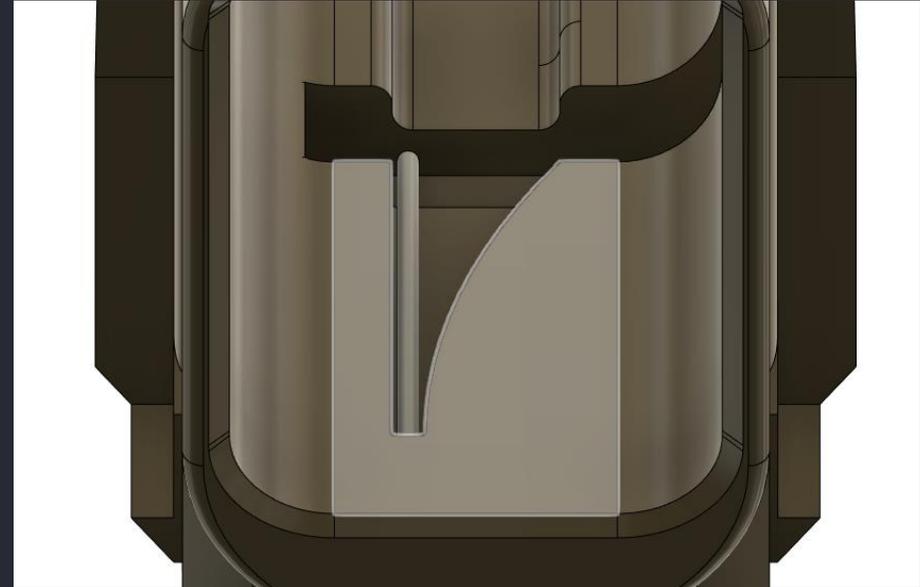
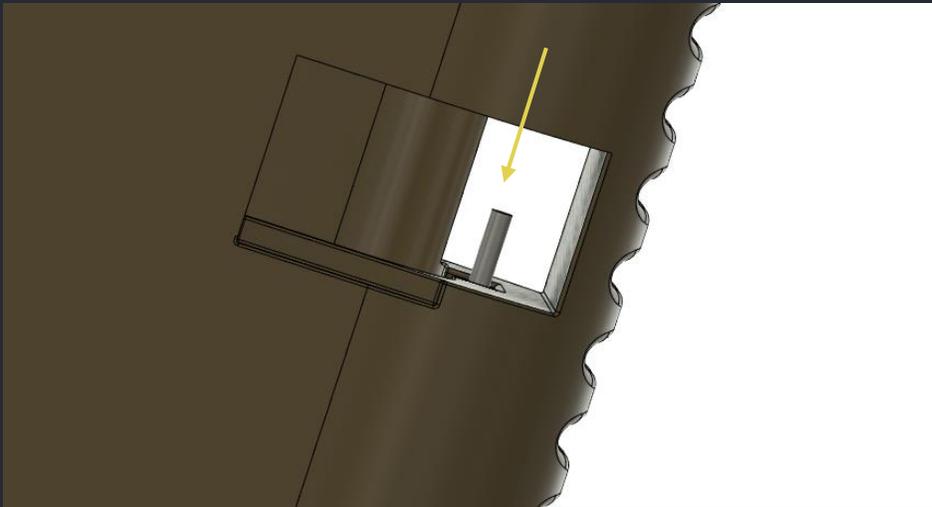
When depressing the button for the brace locking plate, it is normal for a small gap to appear outside the frame. This is not a defect.

With the brace installed and locked in the forward position, install the two end-stop screws in the front threaded holes of the brace bars.



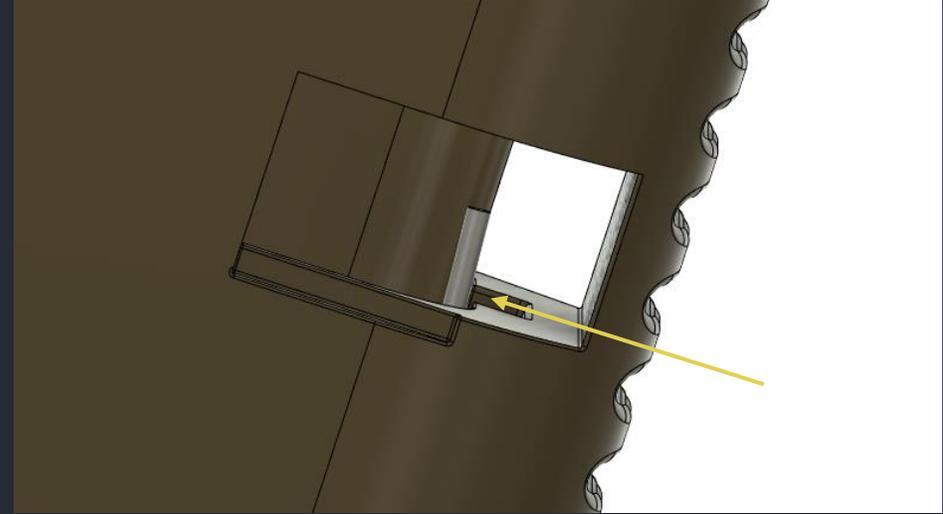
Installing the forward Magazine Catch

Next is the installation of the forward magazine catch. The length given for the spring is intentionally a bit long since it is easier to remove material than to add it, keep this in mind during installation. From below the magazine holder, install the magazine catch spring into the spring slot.



Through the larger magazine catch opening, use a screwdriver or other similarly small tool to push the pin downward into position.

From the narrower opening, use a small tool to gently press and hold the spring toward the magazine well to allow space for the magazine catch to be installed.



As you slide the magazine catch under the spring, remove your screwdriver to allow the spring to fall onto the magazine catch. At this point, you can attempt to reassure that the spring is seated into the spring slot completely with your finger.

Using a screwdriver or similar tool, press the spring toward the opening in the magazine catch while simultaneously holding the magazine catch in place so that it doesn't move. Using a wider flathead screwdriver and holding it at a bit of an angle helped to provide both sideways and forward force to guide the spring into place.

If you are having a hard time installing the pin, it may be too long, you may consider trimming the spring a bit to make installation easier.



Troubleshooting and Known Issues

This segment is dedicated to troubleshooting the brace mechanism. Any other functional issues with the operation of the other components should be referenced against the troubleshooting guide in the FDMA build instructions.

Problem: Brace will not travel forward enough to lock into place

Solution 1: Ensure that there is no debris in the spring channel on the brace itself that could be blocking the pin and keeping it from traveling forward

Solution 2: If the spring will not compress any further, consider removing the washer from the spring pin to allow a bit more clearance. This could also happen if the spring is out of spec.

Problem: Brace will not lock into closed position even though it is pressed in all the way

Solution 1: The notches are not reaching the locking plate, consider using a file to extend the notches forward

Solution 2: The locking plate has failed, consider replacing the locking plate.

Problem: Brace does not extend completely and gets stuck

Solution 1: Brace bars may be bent or have burs on the notch cuts. Ensure that the bars are straight and that the notches are free of burs that may snag on the inside of the frame.

Solution 2: Locking plate spring is too long and does not compress entirely, putting too much pressure on the bars. Consider removing coils from the spring and stretching it.

Solution 3: Consider adding a light coating of grease to the bars to aid in movement.

Known Issues

In this iteration there is nothing in the design that can stop the brace from ejecting from the frame when deployed. I'm working on a way to include some sort of end-stop that will halt the travel of the brace without preventing future uninstallation of the brace or require even more machining or hardware. A 3D printed solution or slight modification to the frame would be ideal.